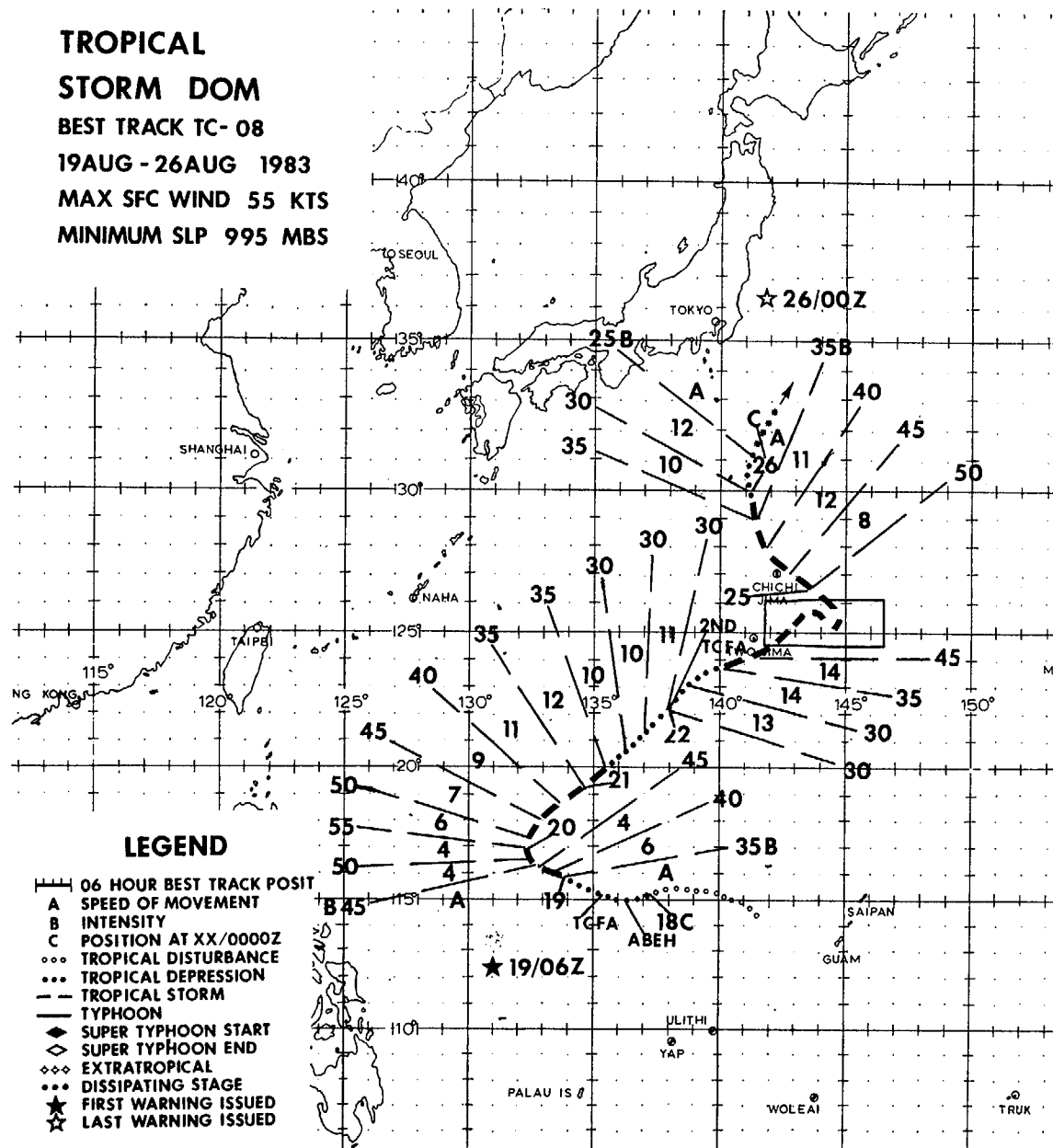
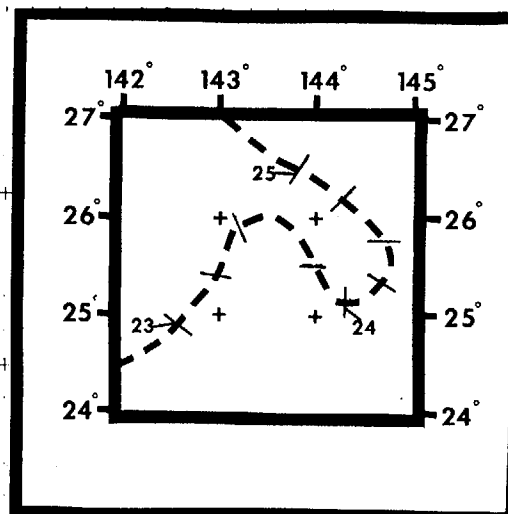


**TROPICAL
STORM DOM**
BEST TRACK TC-08
19AUG - 26AUG 1983
MAX SFC WIND 55 KTS
MINIMUM SLP 995 MBS



LEGEND

- 06 HOUR BEST TRACK POSIT
- A SPEED OF MOVEMENT
- B INTENSITY
- C POSITION AT XX/0000Z
- ... TROPICAL DISTURBANCE
- ... TROPICAL DEPRESSION
- TROPICAL STORM
- TYPHOON
- ◆ SUPER TYPHOON START
- ◇ SUPER TYPHOON END
- ◇◇ EXTRATROPICAL
- ◇◇◇ DISSIPATING STAGE
- ★ FIRST WARNING ISSUED
- ☆ LAST WARNING ISSUED



DTG	SPEED	INTENSITY
2300Z		50
2306Z	7	50
2312Z	5	45
2318Z	5	40
2400Z	5	40
2406Z	4	45
2412Z	5	50
2418Z	7	50
2500Z	7	50

TROPICAL STORM DOM (08W)

Tropical Storm Dom developed from a disturbance which was initially detected west of Guam on 17 August. Over the 10 day period of its life, Dom underwent radical changes in track and intensity. These changes and Dom's lack of significant vertical development created difficulties for JTWC forecasters. Radical intensity changes resulted in a 36-hour period when no numbered tropical cyclone warnings were issued on Dom by JTWC (21-23 August).

As Super Typhoon Abby approached Tokyo on 17 August, low latitude wind regimes began to return to their seasonal mean locations. Figure 3-08-1 shows the orientation of the low-level monsoon and upper-tropospheric troughs on 17 August, as well as the climatological positions for each for the month of August. Of significance is the position of the low-level trough to the west of the upper-level trough, which was anchored to an intense upper-tropospheric cyclone near Guam. As this occurred, an area of strong upper-level divergence formed in the northeasterlies to the west of the upper-level cyclone and a convective disturbance developed within the low-level trough.

On 18 August, a reconnaissance aircraft investigated the disturbance at 700 mb and reported flight level winds of 25 kt (13 m/s) and an extrapolated MSLP of 999 mb. On the basis of this report and subsequent satellite imagery which indicated increased convective organization, a TCFA was issued at 181100Z. The next reconnaissance aircraft mission, at 190735Z, located a well defined surface circulation with an MSLP of 1004 mb and maximum sustained surface winds of 40 kt (21 m/s). The initial warning for Tropical Storm Dom was issued on receipt of this information from the aircraft.

During the two-day period prior to initial warning, Dom had tracked steadily westward at 9 kt (5 km/hr). In spite of this, continued westward movement was rejected by JTWC forecasters and Dom was forecast to move northward from the initial warning. Figure 3-08-2 shows the guidance available to JTWC forecasters from the objective forecasting techniques for the 191200Z warning (Note: objective techniques are originated from a preliminary best track position six hours prior to warning time - in this case 190600Z). Although there were considerable differences in the forecast aids, both dynamic models (NTCM and OTCM) predicted northward movement, reflecting the absence of a strong subtropical ridge. The Prognostic Reasoning Message (WDPAL PGTW) which was issued following the 191200Z warning is the best summary of the situation.

"Dom is forecast to turn northward during the next 24 hours. Low-level steering is predominately from south-to-north and the presence of middle-tropospheric westerlies north of 22N is seen as evidence of the overall weakness of the subtropical ridge over the Philippine Sea." "The most significant feature on the charts is a deep, complex low pressure area which extends eastward from Japan. The FLENUMOCEANCEN prognosis series maintains this mid-latitude trough throughout the forecast period. Its influence is expected to maintain the weakness in the ridge and allow Dom to move northward. Not forecast by the numerical prognoses, but considered possible, is an increase in the southwest monsoonal flow over the Philippine Sea. A linkage between the southwest monsoon and the mid-latitude trough, east of Japan, could cause Dom to track northeastward instead."

The alternate scenario proved correct, as Dom turned sharply northeastward on 20 August.

Throughout much of its life, Dom's low-level center was located northeast of its significant convection. Strong upper-level northeasterlies were exerting considerable pressure on the atmospheric column above Dom, resulting in the consistent tilt toward the southwest. The mission ARWO- on the 192330Z fix mission observed "The extremely slight pressure gradient indicated that this was probably a shallow tropical cyclone....the 700 mb center was located southwest, relative to the surface center, but even further displaced (from the earlier penetration). A solid "wall" of convective activity seemed to be developing at this time, extending through the southwest quadrants." This observation was made at Dom's peak intensity of 55 kt (28 m/s).

As Dom turned northeastward, the area of strongest convective activity became further separated from the surface center (Figure 3-08-3) and eventually weakened. On 21 August, reconnaissance aircraft verified the weakening of the system as observed on satellite imagery. Surface winds near the center were light and surface pressures were up significantly although stronger, near gale-force, winds were present 50 to 60 nm (93 to 111 km) southeast of the surface center, within the monsoonal flow. Since Dom was not expected to reintensify in such a hostile shearing environment, tropical cyclone warnings were suspended after the issuance of the 211200Z warning. In the

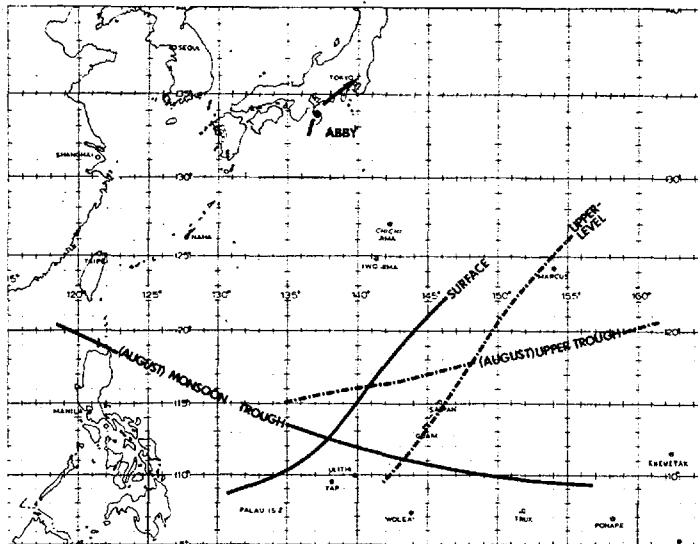


Figure 3-08-1. Location of the axis of the low-level and upper-level troughs on 17 August and the monthly climatological position of the monsoon (low-level) and tropical upper-tropospheric troughs for August. Note the northeast to southwest orientation of each trough on the 17th, and the atypical location of the low-level trough west of the upper-level trough.

subsequent 12 hours, satellite imagery indicated that convective activity was increasing near the center, prompting the issuance of a TCFA at 212330Z. An aircraft reconnaissance mission was flown at 220612Z and found 30 kt (15 m/s) surface winds more than 200 nm (370 km) southeast of a 1003 mb surface center. However, the next mission, at 222351Z found a 995 mb center with a 40 kt (21 m/s) maximum wind 10 nm (19 km) east of the surface center. On the basis of this report, Tropical Storm Dom was returned to warning status at 230000Z while the aircraft was still in the center. As the aircraft exited to the south, it encountered even stronger winds than those previously reported. The following was extracted from the ARWO's² post flight mission report:

"This system continued to have a majority of its weather concentrated in the south....showers were very heavy and ominous looking, in fact, I observed a waterspout trailing from one of the heavier showers. Even though we were only 60 to 100 nm (111 to 185 km) from the center during the invest, we found light and variable winds, especially in the northern half of the storm. I was hard pressed to close off the circulation in the northwest quadrant. Once closed off, the storm showed itself to be a highly compact area of 40 kt (21 m/s) surface winds, extending 45 nm (83 km) from the center. The center itself was a

small area, 3 to 5 nm (6 to 9 km), where the pressure dropped rapidly. This area of low pressure was very definite, but difficult to hit exactly due to its highly localized area. After the fix, we headed due south and, in a 30 nm (56 km) wide band beginning 20 nm (37 km) from the surface center, I observed surface winds reaching 50 kt (26 m/s) with gusts to 60 kt (31 m/s)."

Figure 3-08-4 shows Dom just prior to this aircraft mission.

During Dom's northeastward trek, its movement was correlated to the monsoon southwesterlies and a stationary mid-latitude trough located east of Japan. On 22 August, this trough, including the extra-tropical remains of Super Typhoon Abby (05W) began to move eastward and weaken. This change, along with a lessening of the influence of the upper-tropospheric northeast-erlies over Dom, were contributing factors in Dom's reintensification. It also marked a change in steering influences which resulted in Dom moving erratically from 231200Z to 241200Z, prior to assuming a north-northwestward track. During this period, Dom's intensity dropped slightly, to 40 kt (21 m/s) but peaked again briefly as an upper-level anticyclone became established over the system (Figure 3-08-5). However, this upper-level support proved to be short-lived and Dom was reduced to an exposed low-level circulation of tropical depression intensity a day later.

¹Mission ARWO (Aerial Reconnaissance Weather Officer), 1Lt Gregory T. Marx, USAF.

²Mission ARWO, Capt Stephen W. Lizon, USAF.

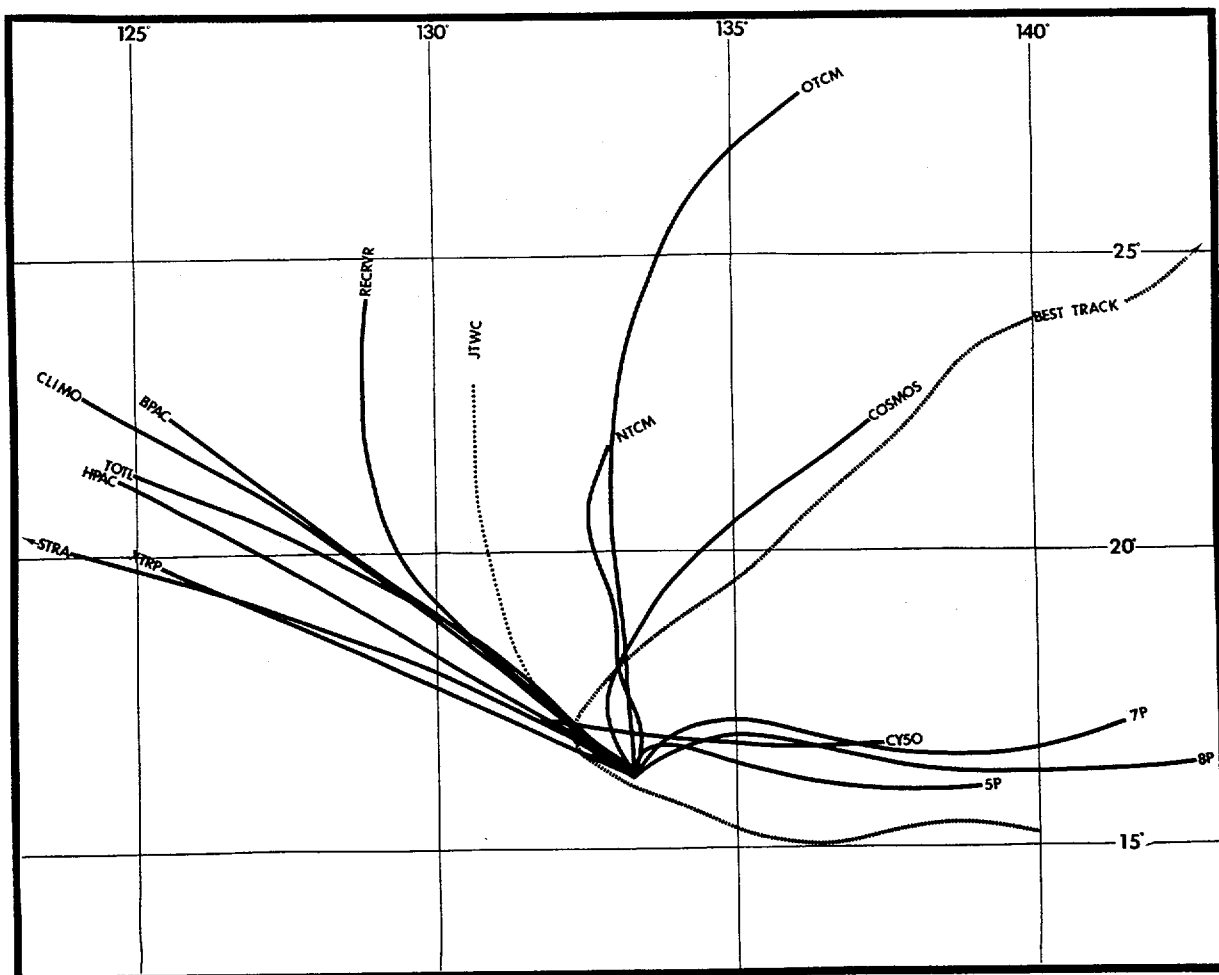


Figure 3-08-2. The standard array of JTWC's objective forecasting techniques available to support the 191200Z warning. Included is the forecast issued at 191200Z and the eventual best track. Note that the technique "COSMOS", currently under test and evaluation at JTWC, did a superior job in forecasting the eventual track.

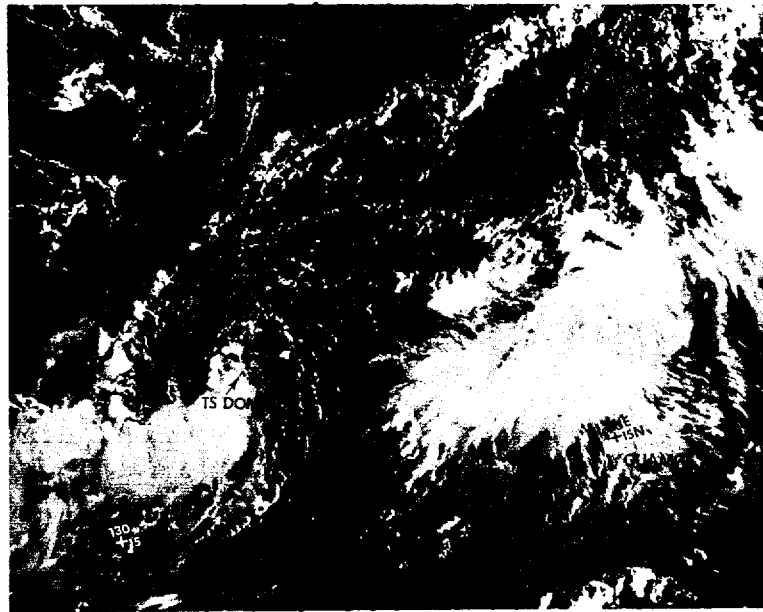


Figure 3-08-3. Satellite imagery shows several convective cells extending toward the southwest and west of Dom's low-level center (202234Z August NOAA 8 visual imagery).

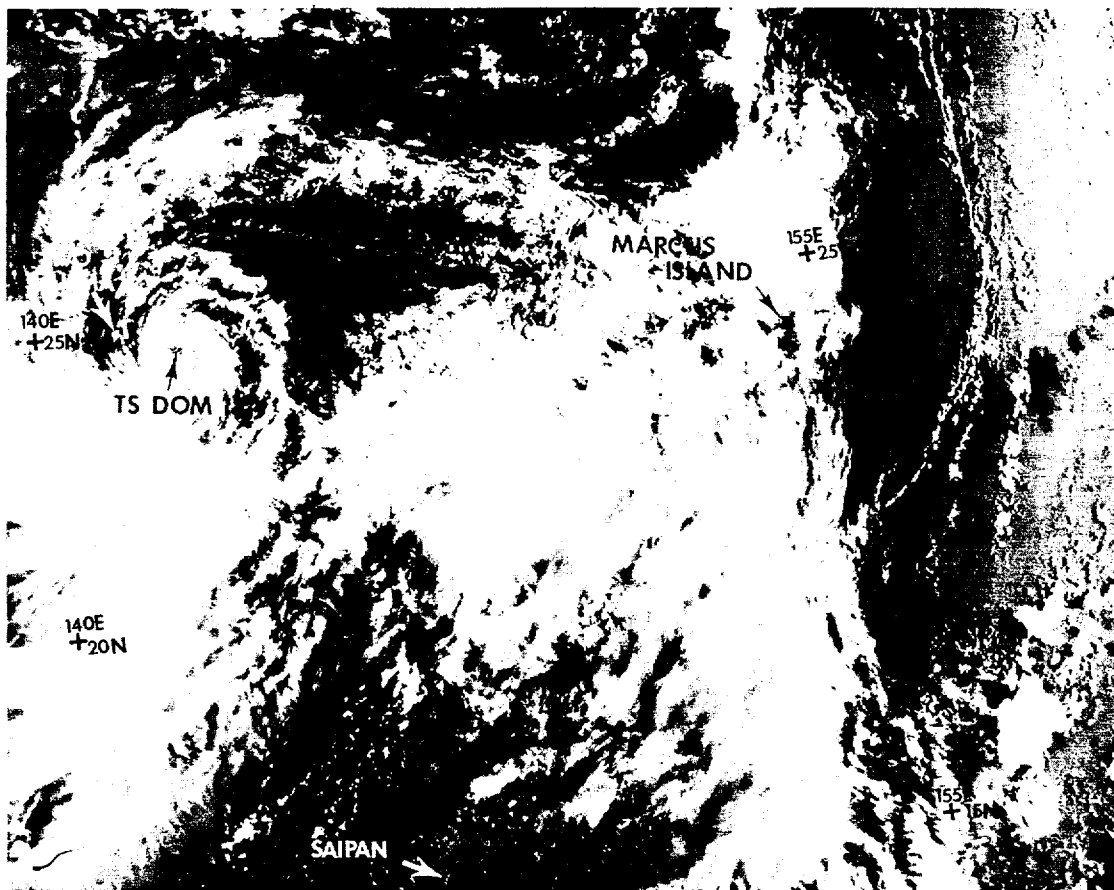


Figure 3-08-4. Satellite imagery received just prior to aircraft data indicates that the system had re-intensified. Note the low-level cloud lines which correspond to the ARMO's description of the system (222150Z August NOAA 8 visual imagery).



Figure 3-08-5. In a last, but brief, period of reintensification, satellite imagery indicates an upper-level anticyclone forming over Dom's low-level center (242033Z August DMSP visual imagery).